

**REMARKS**

Claims 1-24 are pending. The claims as originally filed with the PCT European Receiving Office were amended by Article 34 amendment on August 16, 2000. The amended claims were presented along with the application as filed upon nationalization of the PCT application in the U.S. Patent and Trademark Office. This amendment was set forth on the application transmittal sheet, and the Declaration for Patent Application filed on January 11, 2001. A copy of Amended Claim Sheets that were filed with the 35 U.S.C. § 371 Application for Patent is enclosed herewith for the convenience of the Examiner. Confirmation of the entry of these Amendments under Article 34 is respectfully requested. Claim 25 was canceled by the PCT Article 34 amendment; thus, claims 1-24 are pending. With the present Amendment, claims 1, 9 and 20 are amended.

**Rejections under 35 U.S.C § 102(b)**

Claims 1-8 were rejected as anticipated by U.S. Patent No. 4,915,785 issued to Siminoski et al. (hereinafter "Siminoski et al.") or by Pulp and Paper Canada article by Robitaille (hereinafter "Robitaille"). The Office Action alleges that the compositions disclosed by Siminoski et al. and Robitaille anticipate the present composition as claimed. The applicants respectfully traverse these rejections. Claim 1, as amended herein and by Article 34 amendment recites:

A combination of additives for use in a brightening stage of pulps containing less than 18% lignin, said combination comprising: an aqueous solution of sodium silicate; an alkali agent added in an amount sufficient to maintain a pH of said solution at least about 8; and a magnesium compound which dissociates in said solution to form  $\text{Mg}(\text{OH})^+$  cations, wherein said magnesium compound is added in an amount to achieve, along with any other dissociated magnesium, an  $\text{Mg}:\text{SiO}_2$  mass ratio of between about 1:15 to about 1:2, and wherein at least

25% of the silicates have a molecular weight of at least 10,000 Daltons.

In regards to the Mg: SiO<sub>2</sub> mass ratio, Siminoski et al. disclose compositions comprising silicate and magnesium in which the highest Mg: SiO<sub>2</sub> ratio is 1:16 (first composition of Table 1). In this example, a composition of 6 weight percent 41° Be sodium silicate solution is present with 0.54 weight percent magnesium sulfate. Since 41° Be sodium silicate solution is a commercially available solution of 28.7% silicate, and magnesium is 19.9 weight percent of MgSO<sub>4</sub>, the composition is 0.107 % Mg and 1.7 % silicate, resulting in a Mg:SiO<sub>2</sub> mass ratio of 1:16. Thus the highest Mg:SiO<sub>2</sub> mass ratio composition disclosed by Siminoski et al. has a mass ratio less than the smallest ratio (1:15) set forth in claims 1-8.

The only composition disclosed by Robitaille in which silicate and magnesium are present (Table II) includes 1.0 weight percent sodium silicate (Na<sub>2</sub>SiO<sub>3</sub> is normally assumed when a publication does not state a SiO<sub>2</sub> content of the silicate solution), which equates to 0.492 % SiO<sub>2</sub>, and 0.1 weight percent magnesium sulfate, which equates to 0.02 % magnesium. This composition has a Mg:SiO<sub>2</sub> mass ratio of 1:25.

Since claim 1 recites a composition with a Mg:SiO<sub>2</sub> mass ratio between about 1:2 and about 1:15, it is clearly not anticipated by either Siminoski et al. or Robitaille. Applicants respectfully request withdrawal of these rejections.

#### **Rejections under 35 U.S.C § 103(a)**

Claims 1-8 were rejected as obvious over Siminoski et al. or Robitaille. The Office Action alleges that any differences in the percentages of the compositions disclosed by Siminoski et al. and Robitaille would have been obvious to achieve brightness depending on the type of pulp being brightened. Applicants respectfully traverse these rejections.

Siminoski et al.

Siminoski et al. teach a composition for bleaching MECHANICAL pulp. It is known in the art that the bleaching mechanism for mechanical pulps varies significantly from the mechanism of chemical pulps. Some of these differences are set forth in the background of the present application (page 1, line 27 – page 2, line 13) which notes that chlorine dioxide ( $\text{ClO}_2$ ) is used commonly as a brightener in chemical pulps, whereas it is known to darken mechanical pulps. As such the teachings disclosed for use in a mechanical pulp bleaching process would not be considered by one skilled in the art as instructive towards a chemical bleaching process.

Additionally, the disclosure of Siminoski et al. teaches away from the  $\text{Mg}:\text{SiO}_2$  mass ratio recited in the present claims. The highest  $\text{Mg}:\text{SiO}_2$  ratio taught by Siminoski et al. (as detailed above in addressing the § 102 rejection) provided the poorest brightening results. Any teachings provided by Siminoski et al. would teach away from the present invention, as the pulp brightening compositions improve their performance as the  $\text{Mg}:\text{SiO}_2$  ratio moves away from the  $\text{Mg}:\text{SiO}_2$  ratio recited in claims 1-8. Thus, it would not have been obvious to one of ordinary skill in the art to modify the compositions of Siminoski et al. to achieve the present invention.

Robitaille

The disclosure of Robitaille, also teaches away from the  $\text{Mg}:\text{SiO}_2$  mass ratio as claimed, and furthermore, teaches away from the inclusion of Mg and  $\text{SiO}_2$  entirely. Robitaille states that mill runs were conducted without the stabilizers ( $\text{MgSO}_4$  and  $\text{Na}_2\text{SiO}_3$ ), with unchanged results; “Mill experience quickly proved that stabilizers were indeed unnecessary to achieve a significant increase in brightness.” (page 412, third column) The applicants have proceeded contrary to the teachings of Robitaille in achieving a composition comprising magnesium sulfate and silicate.

EP 622, 491 in view of Robitaille, in view of AU 567,787 or Singh

Claims 9-20 were rejected as obvious over EP 622,491 in view of Robitaille, in view of AU 567,787 or Singh with or without the admitted prior art. Applicants respectfully traverse this rejection.

The Office Action alleges that Australian Patent 567,787 teaches bleaching of a chemical pulp, and that it would be obvious to use a bleaching liquor as taught in Robitaille to bleach chemical pulp. Applicants respectfully disagree with this allegation for the following reasons.

Australian Patent 567,787 deals exclusively with the delignification stage of a chemical pulp and provides no evidence or data directed towards the brightening stage of the pulp. The present invention provides an additive for brightening chemical pulp after the delignification of the pulp. One of ordinary skill in the art would have no motivation to combine the bleaching agent disclosed by Robitaille with the chemical delignification process taught in AU 567,787 to arrive at the chemical bleaching composition as recited in claims 9-20.

Alternatively, the Office Action alleges that Singh teaches that Kraft pulp can be bleached by the CEDPD sequence and that a person in the art would recognize that the Robitaille composition could be used to bleach a chemical pulp as it was used in the CEDPD sequence. Applicants respectfully disagree with this assessment. Robitaille teaches away from using Mg and SiO<sub>2</sub> stabilizers in bleaching processes, as Robitaille reports no brightening benefits from the added stabilizers. Singh provides no disclosure of added Mg in pulp brightening. Since Robitaille discourages the use of Mg and SiO<sub>2</sub> generally in pulp processing, and Singh provides no disclosure addressing Mg, one of ordinary skill in the art would not combine these references to arrive at the composition set forth in claims 9-19 or the method set forth in claim 20. Therefore, it would not have been obvious to one of ordinary skill in the art to have combined the teachings of Singh and Robitaille to arrive at the present invention as set forth in claims 9-20.

The Office Action furthermore combines the above references with admitted prior art in the specification. There is no disclosure in the admitted prior art of a Mg:SiO<sub>2</sub> ratio as recited in claims 9-20 in a composition for brightening chemical pulp.

The Office Action includes EP 622,491 in the statement of rejection at page 2, last paragraph, however there was no statement in the Office Action that addressed the particular disclosure of EP 622,491 relied on in asserting the rejection. Applicants request that the Office provide the disclosure and rationale regarding the § 103 rejection based on EP 622,491.

Robitaille in view of AU 567,787 or Singh, in view of Tibbling et al.

Claims 21-25 were rejected as obvious over Robitaille, in view of AU 567,787 or Singh with or without the admitted prior art, further in view of Tibbling et al. Applicants respectfully traverse this rejection.

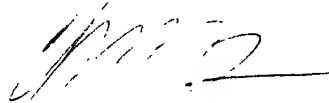
Claim 25 was canceled by way of Article 34 during PCT examination, rendering this rejection moot. The Office Action alleges that Tibbling et al. teach peroxide bleaching of chemical pulp by conducting the peroxide bleaching under oxygen gas pressure. Tibbling et al. provide no disclosure of a brightening method using Mg and Silicate. Since Robitaille teaches away from including Mg and SiO<sub>2</sub> in pulp processing, and Tibbling et al. are silent regarding the use of silicates in a method for brightening pulp, one of ordinary skill in the art would not arrive at the present invention as set forth in claims 21-24 by the combined teachings of Robitaille and Tibbling et al. with or without the admitted prior art. Applicants respectfully request withdrawal of the rejections under § 103 for the reasons set forth above.

As amended by the Article 34 Amendment, claims 1-23 recite that *at least 25% of the silicates have a molecular weight of at least 10,000 daltons*. Claim 24 specifies a sodium silicate solution having a high percentage of high molecular weight silicates. It is respectfully submitted that none of the cited

references disclose or suggest the invention as claimed, which includes these features introduced by the Article 34 Amendment.

In view of the foregoing amendments and remarks, the applicants respectfully request reconsideration and allowance of this application.

Respectfully submitted,



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PDP/

Enclosures: Version with markings to show changes made  
Copy of Amended Sheets

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Christopher R. Lewis

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1                    1.        (Amended) A combination of additives for use in a  
2        brightening stage of pulps containing less than 18% lignin, said combination  
3        comprising: an aqueous solution of sodium silicate; an alkali agent added in an  
4        amount sufficient to maintain a pH of said solution at least about 8; and a  
5        magnesium compound which dissociates in said solution to form  $\text{Mg}(\text{OH})^+$  cations,  
6        wherein said magnesium compound is added in an amount to achieve, along with  
7        any other dissociated magnesium, an  $\text{Mg}:\text{SiO}_2$  mass ratio of between about [1:46]  
8        1:15 to about 1:2, and wherein at least 25% of the silicates have a molecular weight  
9        of at least 10,000 Daltons.

1                    9.        (Amended) An aqueous composition for use in a brightening  
2        stage of pulps comprising:

3                    pulp containing less than 18% lignin;

4                    an aqueous solution of sodium silicate;

5                    an alkali agent added in an amount sufficient to maintain the pH at  
6        least about 8; and

7                    a magnesium compound which dissociates in said solution to form  
8         $\text{Mg}(\text{OH})^+$  cations, wherein said magnesium compound is added in an amount to  
9        achieve, along with any other dissociated magnesium, an  $\text{Mg}:\text{SiO}_2$  mass ratio of  
10       between about [1:46] 1:15 to about 1:2, and wherein at least 25% of the silicates  
11       have a molecular weight of at least 10,000 Daltons.

1                    20.       (Amended) A method for brightening pulp comprising the  
2        steps of:

3                    mixing pulp containing less than 18% lignin with hydrogen peroxide,  
4        an aqueous solution of sodium silicate; an alkali agent added in an amount sufficient

5 to maintain the pH of said solution at least about 8; and a magnesium compound  
6 which dissociates in said solution to form  $\text{Mg}(\text{OH})^+$  cations, wherein said  
7 magnesium compound is added in an amount to achieve, along with any other  
8 dissociated magnesium, an  $\text{Mg}:\text{SiO}_2$  mass ratio of between about [1:46] 1:15 to  
9 about 1:2, to form a mixture, and wherein at least 25% of the silicates have a  
10 molecular weight of at least 10,000 Daltons; and

11 heating said mixture to allow said mixture to react to cause a portion  
12 of said lignin to degrade.